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AUTHOR Rubba, Peter A.
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ABSTRACT

The Science Teacher Inventory of Need (STIN) is an 83-item instrument which assesses science teachers' perceptions of their professional needs. Items on the STIN are organized under seven categories: (1) specifying objectives for science instruction; (2) diagnosing and evaluating learners for science instruction; (3) planning science instruction; (4) delivering science instruction; (5) managing science instruction; (6) administering science instructional facilities and equipment; and (7) improving one's competence as a science teacher. Seventy-six items consist of a statement which describes a task a science teacher may be called upon to perform, followed by a coded scale and a blank line to indicate the exact nature of any item-associated need or to list specific topics of interest. The last item in each category is open-ended to relate needs which do not fit into any other items in that category. The instrument is judged to be both valid and reliable. Content and construct validity were determined by a panel of judges and factor analysis respectively. High reliability values (r=0.95) were obtained when a bilingual form of the STIN was field tested with a population of Jordanian teachers. The instrument is appropriate for measuring needs of science teachers in developing countries as well as other nations, given accurate translations are used. The STIN instrument and an optional STIN response sheet are included. (JN)

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THE SCIENCE TEACHER INVENTORY OF NEED (STIN)

description prepared by

Peter A. Rubba, Ed.D.
Curriculum, Instruction and Media
Southern Illinois University
Carbondale, IL 62901

Description

The Science Teacher Inventory of Need (STIN) is an 83 item instrument which assesses science teachers' perceptions of their professional needs. The items on the STIN are organized under seven categories:

Specifying Objectives for Science Instruction

Diagnosing and Evaluating Learners for Science Instruction

Planning Science Instruction

Delivering Science Instruction

Managing Science Instruction

Administering Science Instructional Facilities and Equipment

Improving One's Competence as a Science Teacher

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Seventy-six of the STIN's items consist of a statement which describes a task a science teacher may be called upon to perform, followed by the coded scale "NA 1 2 3 4" (where NF = not familiar with the task, 1 = no need, 2 = little need, 3 = moderate need, and 4 = great need). A blank is provided following the task descriptor portion of each item so respondents can state the exact nature of

SE 043 742

any item-associated need or list specific topics of interest. For example, the first item appears as follows:

1. Specify a rationale for teaching science in school NF 1 2 3 4

_____

The last item in each of the seven categories is open-ended so respondents can register category related needs which they could not fit into any of the other items in that category.

In completing the STIN respondents indicate the degree of need they perceive they have relative to each of 76 inventory items by marking the coded scale, 1 through 4, or their non-familiarity with the task described in the item by marking the "NF" code. Respondents can detail the nature of that need or list specific topics of interest to them by filling in the blank which is part of these items. They also may choose to complete the open-ended item at the end of each section.

Scoring procedures are recommended for the STIN which allow one to examine responses to individual items (e.g., determining mean item need values using response codes 1 through 4, and completing a frequency distribution on the "NF" response) or groups of STIN items (e.g., factor analysis of responses).

The development and validation of the STIN is described by Zurub and Rubba (1983). In that study a panel of experts judged the STIN to be content valid--a comprehensive treatment of the tasks which science teachers perform in the course of carrying out their instructional duties. STIN construct validity as a measure of science teacher

needs was substantiated via factor analysis (9 factors accounted for 84.9% of total STIN variance). A bilingual form of the STIN (the translation was verified) was field tested with a population of Jordanian science teachers. High reliability values were obtained (coefficient alpha and split-half methods both yielded r values of 0.95).

While Zurub and Rubba (1983) conclude the STIN is an appropriate instrument of use in measuring the needs of science teachers in developing nations (given accurate translations are used), they do not preclude its use with science teachers in other nations. Should a researcher consider using the STIN in another nation, it is suggested that the validity of the STIN be reviewed, and that STIN reliability be re-established for that population.

Included on the following pages of this document are the STIN and an optional STIN Response Sheet.

Reference

Zurub, A.R. & Rubba, P.A. Development and validation of an inventory to assess science teacher needs in developing countries. Journal of Research in Science Teaching, 1983, 20 (9), 867-873.

STIN Response Sheet

Name _____

_____

Date _____

A. Specifying Objectives for Science Instruction

1. NF 1 2 3 4
_____

2. NF 1 2 3 4
_____

3. NF 1 2 3 4
_____

4. NF 1 2 3 4
_____

5. NF 1 2 3 4
_____

6. NF 1 2 3 4
_____

7. NF 1 2 3 4
_____

8. NF 1 2 3 4
_____

B. Diagnosing and Evaluating Learners for Science Instruction

1. NF 1 2 3 4
_____

2. NF 1 2 3 4
_____

3. NF 1 2 3 4
_____

4. NF 1 2 3 4
_____

5. NF 1 2 3 4
_____

6. NF 1 2 3 4
_____

7. NF 1 2 3 4
_____

8. NF 1 2 3 4
_____

9. NF 1 2 3 4
_____

10. NF 1 2 3 4
_____

11. NF 1 2 3 4
_____

C. Planning Science Instruction

1. NF 1 2 3 4 _____
2. NF 1 2 3 4 _____
3. NF 1 2 3 4 _____
4. NF 1 2 3 4 _____
5. NF 1 2 3 4 _____
6. NF 1 2 3 4 _____
7. NF 1 2 3 4 _____
8. NF 1 2 3 4 _____

D. Delivering Science Instruction

1. NF 1 2 3 4 _____
2. NF 1 2 3 4 _____
3. NF 1 2 3 4 _____
4. NF 1 2 3 4 _____
5. NF 1 2 3 4 _____
6. NF 1 2 3 4 _____
7. NF 1 2 3 4 _____
8. NF 1 2 3 4 _____
9. NF 1 2 3 4 _____
10. NF 1 2 3 4 _____
11. NF 1 2 3 4 _____
12. NF 1 2 3 4 _____
13. NF 1 2 3 4 _____
14. NF 1 2 3 4 _____
15. NF 1 2 3 4 _____
16. NF 1 2 3 4 _____
17. NF 1 2 3 4 _____
18. NF 1 2 3 4 _____

19. NF 1 2 3 4

_____

E. Managing Science Instruction

1. NF 1 2 3 4

_____

2. NF 1 2 3 4

_____

3. NF 1 2 3 4

_____

4. NF 1 2 3 4

_____

5. NF 1 2 3 4

_____

6. NF 1 2 3 4

_____

7. NF 1 2 3 4

_____

8. NF 1 2 3 4

_____

9. NF 1 2 3 4

_____

10. NF 1 2 3 4

_____

11. NF 1 2 3 4

_____

F. Administering Science Instructional Facilities and Equipment

1. NF 1 2 3 4

_____

2. NF 1 2 3 4

_____

3. NF 1 2 3 4

_____

4. NF 1 2 3 4

_____

5. NF 1 2 3 4

_____

6. NF 1 2 3 4

_____

7. NF 1 2 3 4

_____

8. NF 1 2 3 4

_____

9. NF 1 2 3 4

_____

G. Improving One's Competence As A Science Teacher

1. NF 1 2 3 4 _____

2. NF 1 2 3 4 _____

3. NF 1 2 3 4 _____

4. NF 1 2 3 4 _____

5. NF 1 2 3 4 _____

6. NF 1 2 3 4 _____

7. NF 1 2 3 4 _____

8. NF 1 2 3 4 _____

9. NF 1 2 3 4 _____

10. NF 1 2 3 4 _____

11. NF 1 2 3 4 _____

12. NF 1 2 3 4 _____

13. NF 1 2 3 4 _____

14. NF 1 2 3 4 _____

15. NF 1 2 3 4 _____

16. NF 1 2 3 4 _____

17. NF 1 2 3 4 _____

STIN

(Science Teacher Inventory of Need*)

The STIN was developed to assess science teachers' perceptions of their professional needs. It contains 83 items grouped under seven instruction related categories. Each item is composed of a statement, a coded scale, and a blank. The statement portion of an item describes a task a science teacher may be called upon to perform. Following the statement is the coded scale "NF 1 2 3 4" where:

NF = Not Familiar with the task
1 = No Need
2 = Little Need
3 = Moderate Need
4 = Great Need

The blank is found below the statement. Here is an example item.

0.0 Employ programmed instruction NF 1 2 3 4

_____

In responding to an item you are asked:

1. to circle the <u>one</u> code that best designates the <u>degree</u> to which <u>you</u> have a need for help with the task; and,
2. <u>if you wish</u>, to detail the nature of your need by listing specific topics in the blank.

Let's consider another example.

0.0 Provide instruction in microscopic technique NF 1 2 (3) 4

Gram's Staining Technique

The science teacher who responded to this item felt he/she had a "Moderate Need" for help on the task "Provide instruction in microscopic technique." The science teacher particularly wanted help on how to use Gram's Staining Technique. If a science teacher was "Not Familiar" with the task described in the item, he/she would circle the "NF" code.

PLEASE RESPOND TO EACH OF THE ITEMS ON THE FOLLOWING PAGES. YOU MAY MARK YOUR RESPONSES IN THIS BOOKLET <u>UNLESS</u> YOU HAVE BEEN SUPPLIED WITH A SEPARATE ANSWER/RESPONSE SHEET.

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NF	1	2	3	4
Not Familiar	No Need	Little Need	Moderate Need	Great Need

A. SPECIFYING OBJECTIVES FOR SCIENCE INSTRUCTION

1. Specify a rationale for teaching science in school

_____ NF 1 2 3 4

2. Establish a science curriculum/program

_____ NF 1 2 3 4

3. Determine the content of a science course

_____ NF 1 2 3 4

4. Write learning objectives which specify knowledge students are to develop as a function of science instruction

_____ NF 1 2 3 4

5. Write learning objectives which specify attitudes students are to develop as a function of science instruction

_____ NF 1 2 3 4

6. Write learning objectives which specify skills students are to develop as a function of science instruction

_____ NF 1 2 3 4

7. Arrange instructional objectives in the sequence in which they will be addressed during science instruction

_____ NF 1 2 3 4

8. Please list and rate any other needs you have relative to specifying objectives for science instruction

_____ NF 1 2 3 4

_____ NF 1 2 3 4

B. DIAGNOSING AND EVALUATING LEARNERS FOR SCIENCE INSTRUCTION

1. Design assessment items/procedures which validly assess science instructional objectives

_____ NF 1 2 3 4

NF	1	2	3	4
Not Familiar	No Need	Little Need	Moderate Need	Great Need

2. Use assessment data to determine student readiness for science instruction (physical, intellectual, social, emotional)

_____ NF 1 2 3 4

3. Use assessment data to diagnose science learning difficulties (physical, intellectual, social, emotional)

_____ NF 1 2 3 4

4. Arrange assessment items into a test

_____ NF 1 2 3 4

5. Construct and use a science assessment item file/bank

_____ NF 1 2 3 4

6. Arrange informal assessment situations in science teaching

_____ NF 1 2 3 4

7. Use oral questions in science instruction

_____ NF 1 2 3 4

8. Administer tests and quizzes

_____ NF 1 2 3 4

9. Utilize student assessment data in determining grades

_____ NF 1 2 3 4

10. Select, administer and interpret standardized test instruments

_____ NF 1 2 3 4

11. Please list and rate any other needs you have relative to diagnosing and evaluating learners for science instructions

_____ NF 1 2 3 4

_____ NF 1 2 3 4

NF	1	2	3	4
Not Familiar	No Need	Little Need	Moderate Need	Great Need

C. PLANNING SCIENCE INSTRUCTION

1. Use student readiness data to plan for science instruction

_____ NF 1 2 3 4

2. Develop an instructional plan for a unit (e.g. six weeks) of science instruction

_____ NF 1 2 3 4

3. Select appropriate instructional strategies for science instruction

_____ NF 1 2 3 4

4. Develop a lesson plan for a single science class session

_____ NF 1 2 3 4

5. Select commercially prepared instructional materials for science instruction

_____ NF 1 2 3 4

6. Prepare teacher made instructional materials for science instruction

_____ NF 1 2 3 4

7. Arrange the physical environment for science instruction

_____ NF 1 2 3 4

8. Please list and rate any other needs you have relative to planning science instruction

_____ NF 1 2 3 4

_____ NF 1 2 3 4

D. DELIVERING SCIENCE INSTRUCTION

1. Motivate students to learn science

_____ NF 1 2 3 4

NF	1	2	3	4
Not Familiar	No Need	Little Need	Moderate Need	Great Need

2. Use an inquiry teaching strategy in teaching science

_____ NF 1 2 3 4

3. Conduct a science laboratory session

_____ NF 1 2 3 4

4. Deliver a lecture/illustrated talk on a science topic

_____ NF 1 2 3 4

5. Demonstrate a science concept

_____ NF 1 2 3 4

6. Demonstrate a science process skill

_____ NF 1 2 3 4

7. Demonstrate a science manipulative skill

_____ NF 1 2 3 4

8. Direct a field trip in teaching science

_____ NF 1 2 3 4

9. Employ simulation techniques in teaching science

_____ NF 1 2 3 4

10. Employ team teaching in science class

_____ NF 1 2 3 4

11. Employ value clarification strategies in science teaching

_____ NF 1 2 3 4

12. Employ individualized instructional strategies in teaching science

_____ NF 1 2 3 4

13. Conduct a group discussion/panel discussion in teaching science

_____ NF 1 2 3 4

NF	1	2	3	4
Not Familiar	No Need	Little Need	Moderate Need	Great Need

14. Employ peer tutoring in science teaching

_____ NF 1 2 3 4

15. Use audio-visual equipment to support science instruction

_____ NF 1 2 3 4

16. Use area/regional resources to support science instruction

_____ NF 1 2 3 4

17. Use computers/teaching machines to deliver science instruction

_____ NF 1 2 3 4

18. Use library/media center to support science instruction

_____ NF 1 2 3 4

19. Please list and rate any other needs you have relative to delivering science instruction

_____ NF 1 2 3 4

_____ NF 1 2 3 4

E. MANAGING SCIENCE INSTRUCTION

1. Manage a science instructional budget

_____ NF 1 2 3 4

2. Provide for students' safety in the science laboratory

_____ NF 1 2 3 4

3. Attend to students' physical, emotional and social needs in science instruction

_____ NF 1 2 3 4

4. Keep student records

_____ NF 1 2 3 4

NF	1	2	3	4
Not Familiar	No Need	Little Need	Moderate Need	Great Need

5. Communicate student science learning progress to the student, administrators and parents

_____ NF 1 2 3 4

6. Supervise tutoring of science students

_____ NF 1 2 3 4

7. Supervise a para-professional in the science classroom

_____ NF 1 2 3 4

8. Maintain student discipline

_____ NF 1 2 3 4

9. Evaluate one's own instructional effectiveness as a science teacher

_____ NF 1 2 3 4

10. Use a computer to manage instruction

_____ NF 1 2 3 4

11. Please list and rate any other needs you have relative to managing science instruction

_____ NF 1 2 3 4

_____ NF 1 2 3 4

F. ADMINISTERING SCIENCE INSTRUCTIONAL FACILITIES AND EQUIPMENT

1. Organize a science laboratory room

_____ NF 1 2 3 4

2. Set up a laboratory supply order, storage and retrieval system

_____ NF 1 2 3 4

3. Maintain science laboratory equipment

_____ NF 1 2 3 4

4. Construct science laboratory equipment

_____ NF 1 2 3 4

5. Select science laboratory equipment for student use

_____ NF 1 2 3 4

NF	1	2	3	4
Not Familiar	No Need	Little Need	Moderate Need	Great Need

6. Identify sources of free and inexpensive science instructional materials

_____ NF 1 2 3 4

7. Select supportive materials (library books, films) for science instruction

_____ NF 1 2 3 4

8. Maintain live organisms for science instruction

_____ NF 1 2 3 4

9. Please list and rate any other needs you have relative to administering science instructional facilities and equipment

_____ NF 1 2 3 4

_____ NF 1 2 3 4

G. IMPROVING ONE'S COMPETENCE AS A SCIENCE TEACHER

1. Update one's scientific knowledge in biology

_____ NF 1 2 3 4

2. Update one's scientific knowledge in chemistry

_____ NF 1 2 3 4

3. Update one's scientific knowledge in earth science/geology

_____ NF 1 2 3 4

4. Update one's scientific knowledge in physics

_____ NF 1 2 3 4

5. Update one's scientific skills in biology

_____ NF 1 2 3 4

6. Update one's scientific skills in chemistry

_____ NF 1 2 3 4

NF	1	2	3	4
Not Familiar	No Need	Little Need	Moderate Need	Great Need

7. Update one's scientific skills in earth science/geology

_____ NF 1 2 3 4

8. Update one's scientific skills in physics

_____ NF 1 2 3 4

9. Update one's knowledge of man's utilization of science/technology

_____ NF 1 2 3 4

10. Update one's knowledge of science related career opportunities for students

_____ NF 1 2 3 4

11. Update one's knowledge of science related societal issues

_____ NF 1 2 3 4

12. Update one's background in theories of cognitive development, learning and instruction

_____ NF 1 2 3 4

13. Update one's background in curriculum development

_____ NF 1 2 3 4

14. Update one's background in the philosophy of education

_____ NF 1 2 3 4

15. Update one's background in the philosophy of science

_____ NF 1 2 3 4

16. Work towards a degree in science education

_____ NF 1 2 3 4

17. Please list and rate any other needs you have relative to improving one's competence as a science teacher

_____ NF 1 2 3 4

_____ NF 1 2 3 4

Thank you for completing this instrument!